

Ser. No.10/589,167
Amdt. dated May 5, 2008
Reply to Office Action of February 5, 2008

PU040009

Remarks/Arguments

35 U.S.C. §102

Claims 9-17 stand rejected under 35 U.S.C. §102(b) as being anticipated by Suzuki (U.S. Patent No. 5,909,642).

Currently amended claim 9 describes a “method for controlling a transceiver apparatus, comprising: detecting a power level of third order intermodulation products associated with a power amplifier of said transceiver apparatus; and controlling said power amplifier responsive to said detection; wherein said detecting is performed during transmission by the transceiver; and wherein intermodulation products are represented by leakage signals going through a switch to signal receiving elements during said transmission.”

It is respectfully asserted that Suzuki fails to disclose “controlling said power amplifier responsive to said detection; wherein said detecting is performed during transmission; and wherein intermodulation products are represented by leakage signals going through a switch to signal receiving elements during said transmission” as described in currently amended claim 9.

Suzuki describes a system where an “input unit enters two reference signals having respective different frequencies at a stage preceding a power amplifier. The reference signals are delivered through a predistortion circuit to a power amplifier, and supplied from a predetermined section of the power amplifier. The signals from the power amplifier contain a third-order intermodulation distortion component. Based on the signals from the power amplifier, an extracting unit extracts a frequency component having a frequency which is twice the difference between the frequencies of said two reference signals. A detecting unit detects the extracted frequency component thereby to output a DC voltage. Since the extracted frequency component is correlated to the third-order intermodulation distortion component, the DC voltage represents the magnitude of the third-order intermodulation distortion component.” (Suzuki Abstract)

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The Office Action asserts that Suzuki teaches a "method for controlling a transceiver apparatus (see fig. 1, radio communication device, col. 1, lines 16-21), comprising: detecting a power level of third order intermodulation products associated with a power amplifier of the transceiver apparatus (see col. 2, lines 28-57); and controlling the power amplifier responsive to the detection (see col. 2, lines 51-57)." (Office Action, page 2)

The cited portion of Suzuki describes "extracting means for extracting a frequency component related to the third-order intermodulation distortion, based on a signal supplied from a predetermined section of the power amplifier, detecting means for detecting the frequency component extracted by the extracting means thereby to output a DC voltage corresponding to the third-order intermodulation distortion..." Suzuki does not describe leakage signals going through a switch or their detection, as is described in the currently amended claim 9.

Therefore, it is respectfully asserted that Suzuki fails to disclose "controlling said power amplifier responsive to said detection; wherein said detecting is performed during transmission; and wherein intermodulation products are represented by leakage signals going through a switch to signal receiving elements during said transmission" as described in currently amended claim 9.

In view of the above remarks and amendments to the claims, it is respectfully submitted that there is no 35 USC 112 enabling disclosure provided by Suzuki that makes the present invention as claimed in claim 9 unpatentable. Since dependent claims 10-17 are dependent from allowable independent claim 9, it is submitted that they too are allowable for at least the same reasons that their respective independent claims are allowable. Thus, it is further respectfully submitted that this rejection has been satisfied and should be withdrawn.

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35 U.S.C. §103

Claims 1-7 and 18-19 stand rejected under 35 U.S.C. §103(a) as being unpatentable over Haub (U.S. Patent No. 2005/0026564) in view of Hayashihara (U.S. Patent No. 6,912,377).

Claim 8 stands rejected under 35 U.S.C. §103(a) as being unpatentable over Haub (U.S. Patent No. 2005/0026564) in view of Hayashihara (U.S. Patent No. 6,912,377) further in view of Suzuki (U.S. Patent No. 5,909,642).

Present claim 1 describes an apparatus, comprising a receive chain and a transmitting chain, which receives signal and transmits signal during separate time intervals wherein it further comprises: power amplifying means for amplifying a transmission signal; and control means for controlling said power amplifying means based on a power level estimation of third order intermodulation products associated with said power amplifying means, said intermodulation products being represented by leakage signals going through switch to signal receiving elements during the transmitting mode.

It is respectfully asserted that neither Haub nor Hayashihara, alone or in combination, disclose "control means for controlling said power amplifying means based on a power level estimation of third order intermodulation products associated with said power amplifying means, said intermodulation products being represented by leakage signals going through switch to signal receiving elements during the transmitting mode" as described in present claim 1.

Haub describes a "method for reducing current drain in a communication device includes a first step of detecting interference including intermodulation and crossmodulation products. A next step includes determining a frequency offset of the interference with reference to the operating receiver band. A next step includes measuring a power level of the interference. A next step includes calculating a receiver linearity required to achieve a desired signal-to-interference ratio. A next step includes adjusting the receiver linearity in order to achieve the desired signal-to-interference ratio. Optionally, the receiver

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dynamic range can be adjusted to suit the reduced signal swing due to the reduced linearity." (Haub Abstract)

The Office Action asserts that Haub "teaches an apparatus (see fig. 3), comprising a receive chain (302) and a transmitting chain (100) (see fig. 3, page 3, section [0030]), which receives signal and transmits signal during separate time intervals (see fig. 3, page 3, section [0030]), wherein it further comprises: power amplifying (126) means for amplifying a transmission signal (100) (see fig. 3); and control means for controlling amplifying means based on a power level estimation of third order intermodulation products associated with the power amplifying means (see fig. 4-5 and 7, pages 2-3, section [0017, 0020,0024-0025 and 0028]), the intermodulation products being represented by leakage signals going through switch to signal receiving elements during the transmitting mode (see page 3-4, section [0024-0025, 0028, 0031 and 0034-0035 and 0038]). Haub teaches the control using current and/or gain control. Increasing linearity can be achieved by either lowering a gain of the gain stage and mixer of the receiver, increasing current to the gain stage and mixer of the receiver, or both, When the detecting the third order intermodulation products associated with the power amplifying (see fig. 7)." (Office Action, pages 4-5)

The Office Action admits that Haub does not specifically mention the "controlling of the power amplifying when leak power ratio detected." Applicant respectfully notes that this is not an element from the present claim 1. Applicant asserts, however, that Haub also fails to disclose "control means for controlling said power amplifying means based on a power level estimation of third order intermodulation products associated with said power amplifying means, said intermodulation products being represented by leakage signals going through switch to signal receiving elements during the transmitting mode" as described in present claim 1.

Haub describes the use of linearity reduction to reduce current draw. It is noted that Haub is directed toward current reduction in systems like IS-95 CDMA where the receiver and transmitter must be on "continuously." (Haub, [0003]) In contrast, the present invention is directed at control of power consumption in a system like TD-CDMA, TD-SCDMA, Hiperlan2 or others, "which receives signal and transmits signal during

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separate time intervals." (Claim 1 preamble) Thus, whereas in Haub, detection may be performed at any time, in the present invention, detection is performed for "leakage signals going through switch to signal receiving elements during the transmitting mode," as described in claim 1.

Hayashihara describes a "squaring circuit squares a radio transmission signal. A band-pass filter extracts a spectrum component corresponding to a desired channel, from that low-frequency component of the output of the squaring circuit, which occurs with a center thereof being present near a DC (Direct Current). A level measuring circuit measures the level of the extracted spectrum component. On the other hand, another band-pass filter extracts, from the output of the squaring circuit, a spectrum component corresponding to spectrum spreading due to a distortion in a transmission circuit. Another level measuring circuit measures the level of this extracted spectrum component. A level radio measuring circuit measures a ratio between the level measured by the level measuring circuit and the level measured by the other level measuring circuit, and produces the measured result as a ratio of a leak power to an adjacent channel." (Hayashihara Abstract)

The Office Action asserts that Hayashihara teaches "the controlling of the power amplifying when leak power ratio detected (see fig. 2, power amplifier control circuit (100) controlling the power amplifying of PA (10), col. 2, lines 9-67, col.5, lines 65-col. 6, lines 2)."

Hayashihara describes reduction of power consumption of a handset by operating a power amplifier at minimum necessary supply power. (Hayashihara, column 2, lines 9-12) Hayashihara, however, fails to disclose the use of "power level estimation of third order intermodulation products associated with said power amplifying means, said intermodulation products being represented by leakage signals going through switch to signal receiving elements during the transmitting mode," as described in present claim 1. Instead, Hayashihara

Also, as with Haub, Hayashihara is described with regard to non-time-division-duplexing systems. The present invention relates to a system "which receives signal and

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transmits signal during separate time intervals" with a distinct "transmitting mode," as described in claim 1, during which power-level estimation of third order intermodulation products is performed.

Furthermore, Applicant respectfully disagrees that Examiner's combination of Hayashihara with Haub to add "the controlling of the power amplifying when leak power ratio detected" provides demonstration of the claimed "control means for controlling said power amplifying means based on a power level estimation of third order intermodulation products associated with said power amplifying means, said intermodulation products being represented by leakage signals going through switch to signal receiving elements during the transmitting mode." Finally, as neither Haub nor Hayashihara is directed at time-division duplexing systems, it would not be obvious for one skilled in the art to combine the two for power consumption reduction in a time division duplex system.

In view of the above remarks and amendments to the claims, it is respectfully submitted that there is no 35 USC 112 enabling disclosure provided by Haub or Hayashihara, alone or in combination, that makes the present invention as claimed in claim 1 unpatentable. Since dependent claims 1-8 & 18-19 are dependent from allowable independent claim 1, it is submitted that they too are allowable for at least the same reasons that their respective independent claims are allowable. Thus, it is further respectfully submitted that this rejection has been satisfied and should be withdrawn.

Having fully addressed the Examiner's rejections it is believed that, in view of the preceding amendments and remarks, this application stands in condition for allowance. Accordingly then, reconsideration and allowance are respectfully solicited. If, however, the Examiner is of the opinion that such action cannot be taken, the Examiner is invited to contact the applicant's representative at (609) 734-6804, so that a mutually convenient date and time for a telephonic interview may be scheduled.

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No fee is believed due. However, if a fee is due, please charge the additional fee to
Deposit Account 07-0832.

Respectfully submitted,

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May 5, 2008